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STRATEGY RESEARCH PROJECT

MAINTAINING AND SUSTAINING THE UNITED STATES ARMY IN THE 21ST CENTURY

BY

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USAWC STRATEGY RESEARCH PROJECT

Maintaining and Sustaining the United States Army in the 21st Century

by

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U.S. Army War College CARLISLE BARRACKS, PENNSYLVANIA 17013

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ABSTRACT

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The United States Army is changing across the total spectrum of doctrine, training, leader development, organizations, materiel, and soldier (DTLOMS) structure. This transformation is often referred to as a Revolution in Military Affairs (RMA) which will result in the Army After Next (AAN) force for the 21st century. This anticipated transformation must include a Revolution in Military Logistics (RML) that will position the Nation's as well as the Army's logistical support structure to maintain and sustain the forces envisioned for the 21st century. This paper will examine various logistics enablers and concepts in the context of their impact on DTLOMS and then postulate possible solutions for achieving a logistical end state that can support an Army After Next force structure.

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ACKNOWLEDGMENTS

This paper presents a multitude of ideas, concepts, and combat development initiatives that are ongoing at the Combined Arms Support Command (CASCOM). Many of the ideas and concepts were developed during my assignment at CASCOM as the senior Ordnance Officer in-charge of the Arm/Fix Branch Logistics Concepts and as Deputy Director Combat Developments Ordnance. Many of the maintenance ideas were also the result of developing the Ordnance Vision XXI for the Chief of Ordnance at that time, Major General James Monroe.

I would also like to acknowledge Mr. James Arnold, the principle drafter of the Ordnance Vision document, and the entire Arm/Fix Branch. Mr. Arnold, perhaps more than anyone else, set the tempo for the Ordnance Vision and put forth many of the revolutionary ideas contained in the document. His keen insights and futuristic ideas presented over 2 years ago are just now being recognized in Army After Next (AAN) concepts.

The ideas of a continuos and seamless Combat Service Support pipeline was the vision of Major General Robison, CASCOM Commander 1994-1996. After participating in many of his sessions defining the CSS pipeline, we incorporated his ideas into the Ordnance vision.

Major General Robert Shadley, Chief of Ordnance following MG Monroe, also provided the sound basis for future Ordnance force structure and finalized the Ordnance Vision. Our basic premise was to incorporate a vision of linking combat systems with logisticians for a truly anticipatory logistic structure. I also express thanks to forward thinkers and mentors like Col. (ret) James Ebertowski, Mr. James Arnold, and CW3 Dave Slaughter all of whom contributed significant ideas put forth in this paper.

Although the Ordnance Vision XXI was developed for the Ordnance Corps, its insights and concepts are intended to be applicable to the other Combat Support Branches. In closing it should be note that the Ordnance Vision was intended to be a living document that would evolve as technology change.

BACKGROUND

Our challenge is to be as farsighted and chart the course that will maintain the Army's preeminent status as we move into the 21st century.

- Dennis J. Reimer

This paper will review key logistic visions, concepts, support structure, and materiel items that potentially shape the RML and its implications for DTLOMS. The impetus for the U.S. Army change is the current view that a Revolution in Military Affairs (RMA) is laying the foundation for requirements that will ultimately shape our Army for the 21st century. The Army After Next (AAN) project will significantly change the Army in terms of doctrine, training, leader development, organizations, materiel, and soldier (DTLOMS) structure. If AAN changes are to be revolutionary, then we must be willing to accept and resource major changes in how we maintain and sustain our Army in the 21st century.

In 1996 the Chief of Staff of the U.S. Army, General Dennis

J. Reimer, tasked the Training and Doctrine Commander (TRADOC),

General William W. Hartzog, to chart the course for the Army to

follow into the 21st century. The Army's logistics combat

developers will use the TRADOC Requirements Determination process

to chart the course for achieving a Revolution in Military

Logistics (RML). TRADOC has made it clear that no requirements

will be resourced unless they are developed by using the Requirements Determination process.²

The DTLOMS model of the Requirements Determination will be utilized to review the emerging concepts, capabilities, and logistic enablers that potentially revolutionize military logistics in the 21st century. Three documents will be considered: Army Strategic Logistics Plan (ASLP), the Combined Arms Support Command (CASCOM) Combat Service Support (CSS), Concept of Support for AAN Battle Force, and Joint Vision 2010 Focused Logistics. All three of documents provide requirements for the RML. These requirements will drive change and shape logistics for the AAN.

The principal factors defining the contours and character of military logistics in the 21st century are best described as "change agents". As these drive the evolution of modern logistics, they are part and parcel of any new paradigm.³

The DTLOMS model provides a methodology for examining potential "change agents" in the RML initiatives. Using the DTLOMS various concepts, functions and material improvements will be presented as possible "change agents" and their impact on future logistics.

DOCTRINE

Future doctrine must be the foundation of the RML. Emerging Force XXI and AAN concepts will be instruments to implement changes in the future doctrine for the AAN.

Our future logistics doctrine must account for technological innovation and application. The current <u>Field Manual (FM) 100-5</u>

Operations, 1993, clearly makes this point. "Doctrine seeks to be sufficiently broad and forward looking so that it rapidly accommodates major technological opportunities.... It sets the conditions to exploit technologies"⁴.

The emerging concepts of Force XXI and AAN are setting the conditions for an RML that will require a major paradigm shift if we are to maintain and sustain a force projection Army in the 21st century. The broad change agent concepts such as situational awareness, rapid deployment, battlefield mobility, and modularity will impact our doctrinal change. We must integrate these concepts at all levels of the logistic force structure through systematic updates to our doctrine.

The change process occurring at the strategic level is evident in the emerging doctrine developed for <u>FM 100-5</u>

Operations, <u>FM 100-7 Decisive Force: The Army in Theater</u>

Operations and <u>FM 100-16 Army Operational Support</u>. All three of these Field Manuals have begun to incorporate doctrinal underpinnings that address the concepts cited above. Collectively they provide board doctrinal underpinnings at the strategic level

to achieve a major doctrinal shift in how we will execute logistics in the 21st century.

What is needed today is doctrinal change at the operational and tactical level. We have yet to begin the task of changing our operational and tactical logistics doctrine. Review of operational doctrine for Corps logistics indicates that no serious updates have occurred since the early 1990s, and those that did occur were cosmetic in nature, and only accounted for organizational changes. The current FM 100-15 CORPS OPERATIONS, October 1996, only superficially addresses logistics, and provides little mention of logistics as a key aspect to Corps operations. The same problem exists for FMs on Corps logistics organizations, e.g. FM 63-5 CORPS SUPPORT COMMAND, September 1993, offers little in the way of innovative logistics for the new processes like asset visibility, battlefield distribution, and tailoring logistics support packages. Review of divisional logistics doctrine, FM 63-20 Main Support Battalion, and FM 63-21 Forward Support Battalion; also reflect no updates since 1990.

The doctrinal implications are continued reliance on antiquated doctrine for executing evolving support techniques. If doctrine is the engine of change, then we must start now to incorporate emerging doctrinal change at the operational and tactical level. This will set the stage for logistics to adapt to the insights and concepts from Force XXI and the AAN initiatives.

Today doctrinal change is a slow and tedious process. To overcome this dilatory process we must be willing to incorporate doctrinal change based on programs such as Velocity Management (VM), Total Asset Visibility (TAV), Battlefield Distribution (BD), and Advance Warfighting Experiments (AWE) initiatives.

These current initiatives offer new doctrinal procedures, but are only being addressed at the strategic level. Their doctrinal implications have not yet been addressed at the operational and tactical levels as evident by the current field manuals cited previously.

From an operational and tactical level recent Advanced Warfighter Experiments (AWE) provide insights on doctrinal changes that significantly increase the effectiveness of logistics force structure. During the AWE experiments, new logistics doctrine was tested. The change resulted in the consolidation of logistical functions at the tactical level. However, savings and efficiencies where mitigated because many of the required logistics enablers were not available or not resourced. This lack of enablers negated the efficiencies and undermined the potential of the doctrinal changes. The view from the experiment was that centralizing organizational and direct support (DS) logistics was a workable concept and eliminated an entire layer of logistics doctrinal procedures. The basic doctrinal premise was to unencumber the warfighters from having to control and coordinate their logistics support, thus allowing

them to focus on the warfight. The new concepts require the logistician to plan, coordinate, and execute all logistics for the warfighter. Instead of reacting to logistical requirements once they became known, they were now at the forefront of all logistics plans and operational requirements. Linkage to the warfighter via the appliqué computer permitted a near real time view of all logistics requirements. This new type of doctrinal support is a major shift from today's reactive logistics doctrine. The experiment provided some of the first glimpses of anticipatory logistics. Some issues arose from the experiment, but a recent presentation to the 1998 Army War College class, it was pointed out that warfighters and logisticians alike must be willing to accept changes and move beyond cultural bias if we are to mature our logistics doctrine for the AAN.

The last key element will be reengineering the doctrinal process. The new process must link units, lessons learned data, and the professional military education system. This integrated approach can provide logistical doctrine that is timely, adaptable, and capable of change to meet future requirements. Using connectivity of linked computers, doctrinal updates would be quickly transmitted for review and inputs by major subordinate commands, TRADOC would control the rate of change and ensure changes are required and executable with the guidance of the Requirements Determination process.

Achieving a major doctrinal shift in how we execute logistics in the 21st century will require reengineering of logistic doctrine, not just cosmetic changes in how we do our business. The challenge will be to convince senior leaders to change outmoded practices, procedures and techniques that are based on layered command structures and an echeloned support system.

The implications of emerging technologies and new doctrinal methods of executing future logistics will be profound. The AAN indicates that logistics doctrine must be joint, multinational and capable of operations at all levels. Future logistics doctrine must not only support military operations but also be capable of supporting our national strategy. We must willing to experiment, adapt and change at a much faster pace in order to meet the demands of future operations. Our future logistics doctrine must provide procedures that permit task organizing and tailoring of assets to support the envisioned combat forces of AAN.

TRAINING

In the future logistics training will increasingly focus on operating in a digitized environment, supporting digitized systems, and using digital equipment. The digitized environment envisioned for the future requires logistics training which focuses on skills and not task oriented as it is today. On the

horizon are two emerging change agents, multicapable maintainers, and Logistics Knowledge Navigators.8

The multicapable maintainer concept was a highly skilled mechanic capable of repairing all types of equipment and operating in a seamless logistics system linked to a national provider and a national database. This concept requires a fundamental change in the maintenance-training base, and our focus must shift from training tasks, to training skills.

Today the Ordnance Corps trains several types of weapon system specific mechanics, who are not capable of working different types of equipment, e.g., Bradley system mechanics and Abrams system mechanics. This weapon system oriented task training will become costly and ineffective as the Army increasingly integrates new technology. System oriented maintenance can be changed by leveraging digital data busing, and computer diagnostics for repair of weapon systems. This approach would give maintainers the ability to repair many systems instead of specific systems. Teaching maintainers skills to leverage digital data bus and diagnostics will improve accuracy, reduce downtime, and eliminate the "fog of maintenance." Implications are tremendous: standardized vehicle data buses, sensors, and computer diagnostics, which can be used on all types of equipment, too include NATO and coalition systems. The commercial sector is already using vehicle data busing and computer diagnostics as leap ahead capability, and is moving rapidly to

integrate this technology. ¹⁰ The Society of Automotive Engineers (SAE) and The Maintenance Control Council (TMC) are already paving the way for standardized data buses and software for truck and automobile fleet commonality. ¹¹ This standardization is also proving to be a windfall for training by providing commonality in diagnostic equipment and software failure codes for trouble shooting. The ultimate goal will be a prognostic system that alerts the maintainer prior to failures occurring, allowing for anticipatory parts ordering and repairs prior to system failures.

The second and third order effect of this technology is its potential for leveraging civilian vocational technical colleges, and the industrial training base. These methods are already being widely used in industry today. One such program started by the Ford Motor company called ASSET (Automotive Service Student Training)¹² will help to alleviate the nationwide shortage of automotive mechanics. This program offers an excellent insight for improving Army maintenance training. Ford's ASSET program links with community vocational technical schools to train skilled mechanics that can service the increasingly computerized high-tech automobiles. "Because of this program, Ford Motor Company sees the traditional grease stained mechanic being replaced by well-trained professionals skilled in computer technology."¹³

Programs such as ASSET are good models for the Army to consider as a means to produce a highly skill multicapable

maintainer and reduce training cost. Partnerships with the private sector and industry would also provide soldiers with transferable civilian sector skills. Soldiers that trained in the private sector will have marketable skills when they leave the service. Today that is only possible in a few highly skilled areas like electronics and aviation maintenance. Integrated military and civilian training will also help in the development of national standards for many technical skills, promote commonality, and make the Army much more attractive to a shrinking pool of eligible citizens in the 21st century.

Training for logisticians will also require that they operate in the private sectors to coordinate support. This is evident by the fact the Army continues to outsource and privatize functions. The Army Deputy Chief of Staff for Logistics (DCSLOG), LTG Coburn, stated, "The notion of contracting out and privatization is something that we're going to have to do more and more of." This statement clearly indicates that Army logisticians may one-day leverage industry's information technologies and work jointly with contractors to support future operations. This brings us to the next potential change agent, Logistics Knowledge Navigators.

Future logistics training must focus on information and automation computer skills. The Logistic training base must be capable of producing highly skilled logisticians who have a complete understanding of automation, and databases. Our logisticians will require competencies for navigating military as

well as commercial information systems, and operating as part of a "system of systems". Logisticians will train to become Logistics Knowledge Navigators, skilled in acquiring, shipping, receiving goods and services over a global network. Their training must be linked via automated military and commercial systems. The commercial industry is already headed towards developing automation systems of systems to support their worldwide operations in a global economy.

One private sector example today is Caterpillar's development of an internationally integrated automation system linking customers around the world, and guarantees repair parts delivery anywhere in the world within 48 hours. Using computer skill trained operators on an information network called Fleet Information Systems; Caterpillar will link engine sensors that can transmit information automatically over a wireless network. This "system of systems" will provide fleet status, operating parameters, shipment of parts, and update engine software to improve performance, or repair faulty engines. Cutting edge processes described above are pointing the way logistics in general will be managed and provided in a global economy requiring customer support anywhere in the world at anytime.

The private sector and industry are establishing the automation and information networks for future logistics, but will the Army be ready to integrate our logistics systems into their emerging global network?

Examination of the RML concepts currently being promoted indicates that digitization and automation are the key ingredients for logistics success. Automation is at the heart of the RML, and the impetus will be skilled logisticians who can navigate cyberspace in order to achieve the desired result for support of fast paced operations. As we move into the 21st century, we must shape training programs to provide professional logisticians who are confident, proficient, and skilled in working with or on digital equipment.

The training implications of the AAN are to begin modernizing the training base with links to industry and public vocational technical schools, while leveraging the private sector to save resources, improve skill training, and produce logisticians who possess the right skills for the 21st century. Our training programs must become joint, embedded in our equipment, and capable of connectivity from the individual soldier to the industrial base.

LEADER DEVELOPMENT

The concepts emerging from the AAN and RML indicate that our future leaders must be rooted in information technologies.

Logistics leaders will also require the necessary skills to operate effectively in environments that are knowledge based and highly computerized. "Logistics in the 21st century will be intensely computerized, significantly reducing the extent of

human intervention and decisionmaking". 16 If this statement is true, then those logistic leaders that are managers in the $21^{\rm st}$ century AAN will need a high degree of automation competency.

The previously discussed concept for Logistics Knowledge Navigators also has applicability for logistics leaders who can manage logistics operations in a highly computerized and digitized environment. These logistics navigators with real time logistics situational awareness anticipate warfighter logistics requirements while monitoring the battlespace. With this type of digitization, logistics leaders become linked to the warfighter and their weapon systems, essentially becoming an integrated manager in a "system of systems".

Today our logistics leaders must manage and operate automation systems that are stovepiped, stand alone, and without interfaces between the logistics core competencies of Arm, Fuel, Fix, Sustain and Move. The future logistics automation system and leader must become fully integrated into a seamless logistic management system. Our future logistics leader training will have to ensure they can log-on, navigate, and manage a seamless logistics system that will reach from the tactical level to the strategic level.

Our leader development will need to produce Logistics

Knowledge Navigators who interact with the battlespace to manage logistics for readiness, sustainment, and reconstitution. They will have access to all logistics organizations, including

industry and coordinate battlespace maintenance, services and distribution before the need arises. Logistics leaders execute task based on anticipatory data feeds from linked combat systems and schedule missions based on battle cycles. Critical to their success would be an anticipatory logistics system, which monitors the battlespace via 24-hour data feed during operations. This type of situational awareness will provide Logistics Knowledge Navigators real time situational awareness of fuel, ammunition, readiness, and personnel status, all of which is transmitted by the weapon system's onboard sensors. Logistics leaders with such situational awareness and anticipatory management capability would be able to focused logistics support, and provide it at the right time and place. Joint Vision 2010 Focused Logistics states:

"The fusion of information, logistics, and transportation technologies to provide rapid crisis response, to track and shift assets even while enroute, and to deliver tailored logistics packages and sustainment directly at the strategic, operational and tactical level of operations". 17

Logistics Knowledge Navigators trained in automation skills, and fluent in global networking are the type of logistics leaders needed for executing the requirements stated above.

The Army's Annual Report on the AAN also identified the need to cultivate mature and highly experienced leaders, with mental agility to maintain success on tomorrow's battlefields. The implication for the logisticians will be the ability to operate in virtual, constructive, and private sector information

technologies to accomplish the type of logistics support required in AAN operations.

If we do not begin now to grow and cultivate logistics leaders who can leverage what information and automation technologies have to offer we will fail to prepare them for a future environment that will be highly computerized and information based.

ORGANIZATIONS

Today's strategic environment with its emphasis on readiness for rapid deployment, joint operations, reduced manpower, and leaner logistics creates important design parameters for Army forces. In addition, most hypothetical conflict scenarios for the future anticipate little, if any, time for mobilization and this, too, influences force design. 19

The impact of the changing strategic environment is already beginning to play a major role in how we will design and build logistics organizations to support the AAN. All levels of support from tactical to strategic will be affected by the RML requirements for rapid deployment, battlefield mobility, flexibility, and situational awareness. These requirements will act as change agents, which will influence organizational changes from the tactical level through the strategic level. The footnote above brings home the fact that Army logistics organizations make up a majority of the force structure.

Today logistics organizations are is still primarily organized and equipped to support large combat formations by stockpiling and transporting large quantities of supplies. This type of logistics support is extremely manpower and equipment intensive and will no doubt impede the ability of a future AAN combat force to project and rapidly maneuver. "We have to shrink the logistics umbilical cord, and the way to shorten the logistics umbilical is to leave behind what you don't need."21 this statement is true, then it is imperative that AAN logistics force be lean, tailorable support organizations that are mobile and capable of the same speed, and agility as the maneuver force. The organization challenge for logisticians will be to design tailorable and modular organizations for the AAN. Using the Force XXI and AAN initiatives as change agents, logistic proponents can build future units that have a "plug and play" quality or "modularity". Developing modular logistic force structure will permit logistics units to quickly task organized, function in spilt-based mode, and capable of deploying in modular packages tailored to meet mission requirements. This ability will be crucial if logistics units are going to be capable of the high optempo support envisioned for the AAN.

Insights on tactical logistics have already have begun to emerged from recent FORCE XXI digitization experiment conducted at the National Training Center in March 1997. The experimentation indicates that leaner logistic tails without

mobility, and modularity, are unable to keep pace with the highly mobile combat forces. The results where extended supply lines without adequate force protection, making them lucrative targets for attack by the Opposing Force (OPFOR). To overcome this threat additional combat forces were allocated to protect them. This in turn resulted in reduced combat power forward, slowing of the maneuver tempo, and lessening of the Brigades combat effectiveness. General Hartzog TRADOC Commander commented, "for future organizational designs we're going to have to build in protection capability in a modular way, giving rear echelon units communications systems that would allow them to see the enemy threat, and self-defense capability to destroy it."22 The implications are profound and will likely require logistics units that are equipped with survivable vehicles and weapon systems that can be linked as "sensor-shooter", much like those envisioned for the combat weapon systems.

This experimentation provided other insights on logistic units. The use of multifunctional forward support companies (FSCs) for each maneuver battalion showed potential for reduced stockpiles of supplies, and efficiencies from consolidation of organizational and direct support maintenance. This concept also shows potential for reduced logistics footprint and unencumbering the warfighter from logistics. These experimental insights need to be carefully examined and the final force structure decisions must to be tied to the enabling logistics technologies.

Proceeding on without the enablers will place logistics force structure at risk and jeopardize the warfighters operations.

Operational requirements and unit readiness demand that support at the operational level be the prime focus of logistics. Successful logistics performance at the national level will be measured in terms of its responsiveness to unit readiness at the operating level; and logistics processes must be improved to ensure responsiveness at that level.²³

Operational level logistics organizational changes are just now beginning to address the requirements cited above. The concept is referred to as the Echelons above Division (EAD).

These EAD organizations are probably the largest and least modernized of the current logistics force structure. The challenge with EAD will be to reduce the Corps logistics footprint while providing a higher level of support to the digitized division. Since the future tactical level support is reduced in size and on hand stocks, the future operational level logistics structure will be required to provide faster support over extended lines of communications (LOCs). The EAD structure necessary to support the Force XXI division must be responsive, seamless, and fully resourced. Failure to do this will mitigate any savings at the tactical level and put the warfighter at risk.

The EAD concept more than any other being developed will need to consider serious changes in how we support future battlefield operations. Today force projecting Corps logistics is costly, time consuming, and can rapidly monopolize all available strategic lift assets. The EAD organizations must transition to a

modular force structure that can incorporate civilians, and Logistics Augmentation Program (LOGCAP) into it their structure as a means of reducing reliance on specialized logistics units such as Clothing Exchange and Bath (CEB), Graves Registration, and Heavy maintenance units.

The future EAD structure must be fully integrated in the digitization process and provided assured communications so that linkage and anticipatory logistics mission can be planned, coordinated and executed with minimal interference to the tactical logistics organizations. With digitized links to strategic level logistics, and situational awareness of the tactical level the EAD logistics units will operate from much greater distances, have smaller logistics footprint, and place less strain on strategic lift assets.

Strategically, two concepts are critical to seamless operations that will impact both tactical and operational logistics organizations.

The Combined Arms Support Command's (CASCOM) Theater Support Command (TSC) concept will provide the RML modular, and deployable theater logistics headquarters for support of future AAN operations. The TSC will replace the current doctrinal Theater Area Army Commands (TAACOM) with a leaner, mobile, and tailorable TSC headquarters. This type of lean efficient organization even capitalizes on current Army Reserve force structure to serve as the basis for staffing and employment. As a

focused logistical headquarters, the TSC will provide what is already directed by Joint Pub 4-0, which specifies..." that for a given area and for a given mission, a single commander should be in charge of logistics". 25

The fundamental organizational change at the strategic level that the TSC offers will revolutionize how we execute logistical support in order to achieve an RML. The TSC offers capabilities to capitalize on information technologies and force projection. The TSC organization offers the ability to cut through the "Fog of Log" that often plagues current joint and combined operations. The TSC as a fully digitized and deployable organization with direct access to strategic national level logistics will be the key integrator for the envisioned Force Sustainment Command (FSC) concept.

The Force Sustainment Command (FSC) concept is being developed as part of the Army Strategic Logistics Plan (ALSP). In the July 1997 pamphlet titled: Preparing for the Revolution in Military Logistics, the FSC is addressed in this manner, "what it will look like is not yet clear, but it may be the Army's "arranger" of support, a partner of industry, effectively flattening layers and levels of support between the tactical unit and the FSC." This statement recognizes that strategic level logistics is continuously challenged by operations across a multitude of logistics organizations, and agencies. The ASLP envisions the FSC as providing a single focal point for

orchestrating Army logistical from the tactical level to the national level. This must not become a centralization of logistical assets, and capability, but serve as conduit to enable tactical, operational, and theater logistics organization to access logistics information, arrange for services, distribution, maintenance, and contracting requirements.

The FSC will synergize the actions of logisticians at all levels of support. Through integrated information technologies for real time asset visibility, anticipatory data feeds, and links with industry, the FSC will interconnect all logistics organizations in to a seamless continuum and make optimal use of split-based operations.

These conceptual organizations offer the AAN a true revolutionary capability for capitalizing on information technologies and bringing to fruition a seamless and integrated logistics "system of systems". This "system of systems" must transcend the services rivalries, stovepiped automation systems, and redundant stocks of materials by various Army and Department of Defense agencies. Our future organizations must be tailored across the entire spectrum of joint, industry, contractors, and multinational systems. Key will be the ability to rapidly select, organize, and deploy logistic support packages that enhance operations instead of impeding them.

MATERIEL

The real challenge for our RML campaign plan is to identify, orchestrate, and tie enabling programs and initiatives together—and then test, evaluate, and improve the synergy of the whole until another vision within the RML process is attained²⁷.

Today the whole process of identifying the various logistics materiel enablers becomes programmatic and competitive when viewed from the various combat service support (CSS) branch perspectives. Each branch has a multitude of logistics materiel enablers, many with common applications and many without. This conundrum must be resolved if the CSS branches are to achieve the desired end-state put forth in the Department of the Army's Strategic Logistic Plan. One common focus with common applications of the materiel enablers will better serve the logistics community at large, and secure far more support in the Joint Requirements Oversight Committee (JROC) decisions.

The overall materiel focus appears to be logistics automation/information technologies.

The most important near term enabling capability for the Army and the RML is a single seamless web-based logistics information system, an end - to - end solution, which focuses the entire logistics synergy and system on the warfighter's needs. Without this capability, there will be no revolution in military logistics. This one enabler, this one overarching connectivity enabler for all the RML initiatives -- material, organizational, and business processes -- must receive the highest priority and support from the Army in the form of a program called Integrated Combat Service Support System (ICS3).²⁸

This enabler if fully funded will at long last give the logistician from the strategic level down to the tactical level a fully integrated logistics information system. The goal of the program is to eliminate all the current stovepipe automation system that exists in the Army and across the services in general. Replacing them with a fully integrated "system of systems", that provides for the management of supplies, maintenance, personnel, finance, medical, and transportation. This end state will be logistics "system of systems" that Logistics Knowledge Navigators use to coordinate, plan, anticipate, monitor, track and provide logistics support from anywhere in the world. This enabler has caught the attention of the current Army Chief of Staff, General Reimer who stated, "Logistics automation has always been one of my key issues ... because I am absolutely convinced that we will not have a Revolution in Military Affairs unless we have a revolution in military logistics"29. His statement is on target and is probably the linchpin for achieving the RML.

The next logical step would be to incrementally develop the individual logistics material enablers that improve efficiencies, effectiveness, deployability, and mobility. Numerous programs are underway in all CSS branches, but many are unfunded or lack support across the Army. Using the Army's Strategic Logistics Plan and the tenets of Joint Vision 2010's Focused Logistics the Army must seriously review the CSS material enablers being worked

by each CSS branch and then commit to funding and developing the ones that have the greatest potential for AAN applications. These enablers must be ruthlessly scrubbed against the emerging Force XXI and AAN insights, and funding committed for enablers which met requirements of emerging Force XXI and AAN insights for knowledge and speed.

Materiel enablers for a RML must center on three general areas: Force projection, communications, and mobility. Force projection enablers for CSS must include mundane items like materiel handling equipment (MHE) that is standardized and compatible across the services and industry. Modularized and containerized sustainment packages (predictive push packages)³⁰ that provide anticipatory logistics support in unit sets.

Examples include repair packages, which contain repair parts for anticipated equipment failures that were monitored from weapon system onboard sensors. Soldier sustainment packages cached prior to the end of Battle cycles and being delivered by precision guided systems like Palletized load systems (PLS), Unmanned Guide Vehicles (UAVs) and manned systems like V-22s specifically configured to delivery support pods and equipment.

Logistics communication systems must have robust capability in order to provide the seamless linkage from tactical level to the strategic level and share the same picture of the battlefield that warfighters possess. To do otherwise will surely ensure failure in a conflict that goes beyond the maneuver units

immediate sustainment stocks. The single greatest materiel enablers for communications will be a logistics "system of systems" alluded to earlier. Logistics communication nodes that are deployable and capable of accessing strategic level databases. The logistics communications and automation system must also be fully integrated with soldiers and their weapon systems.

As stated earlier emerging insights are telling us that logistics must also have mobility capabilities that can keep pace with tactical maneuver organizations. Even if logistics vehicles do not follow combat units in the doctrinal manner they do today, they must be capable of quickly traversing extended LOCs and Main Supply Routes (MSRs) to accomplish missions before windows of opportunity close.

Emerging insights from the AAN suggest that future forces may require even faster transport. New types of aircraft and surface ships may be needed to support strategic deployment needs of the AAN...This would not only project our forces faster and safer, it would also enable the psychological domination of an enemy's will to resist long before direct combat operations.³¹

The Army's Strategic Logistics Plan must not only become the roadmap for our CSS branches, but the implementing document for providing TRADOC with the requirements for meeting capabilities identified in Force XXI and the AAN. The material enablers are the capital investments for our future logistics. Our failure to develop and fund the most promising material enablers will result in an unachievable RML. There can be no Revolution in Military

Affairs (RMA) without an RML and no RML without logistics modernization.

SOLDIERS

"I'm much more influenced by the soldiers I talked to during the AWE than by the analysis from organizations that weren't there looking at it on a daily basis." 33

The statement above clearly indicates that no matter what we do in the entire AAN process, the element that must prevail is the soldier. Although soldiers are key to this process we must also recognize the fact that the RML is increasingly moving towards reliance on DoD civilians and their counterparts in the private sector. The DTLOMS process does not procedurally recognize this fact but their impact on future requirements determination should include the civilian implications when developing future concepts or capabilities.

When the question of civilians and privatization was posed to LTG Coburn, the Army's Deputy Chief of Staff for Logistics, he stated: "It's revolutionary... We think it has potential. There are lots of obstacles that have to be worked out before we get there." His statement indicates that for now the Army will continue experiment with utilization of civilians and contractors. For now the focus remains on the soldier, and all our technology solutions will be useless without well trained, competent soldiers that can effectively and intuitively operate in the envisioned AAN.

Logistics soldiers will be the ones who must use, operate, maintain, and sustain the high tech Army of the AAN, so a premium must be placed on achieving many of the concepts outlined in the Training aspect of the DTLOMS. Efforts must remain focused on achieving technology solutions to the manpower and labor intensive logistics operations we have today. Easing this burden on the logistics soldiers will improve efficiencies, and speed the process of executing logistical requirements. This effort can only be achieved if we make a commitment to digitize the logistics soldiers as an integrated member of the future force.

The Chief of Staff of the Army noted: "What we find is the young soldiers that are in our Army today are from what I call the "Pac-Man generation," and they really know how to make information technology work." Enabling these "Pac-Man generation" logistics soldiers with wearable computers and robotics will allow them to accomplish manpower and labor intense logistics support faster and efficiently. These soldiers will be capable of navigating a seamless logistic network to identify requirements, and anticipate need. Essentially becoming an interactive node on the logistics network. They will enhance our situational awareness of the force logistics posture and provide the foxhole to factory linkage.

From the DTLOMS perspective, our future logistics soldier must be capable of operating at all levels of support and multicapable in execution of their missions. We will demand more

of our logistics soldiers than ever before, but if we capitalize on their abilities to use information technologies, we can lessen the burden imposed by reactive logistics support.

SUMMARY

This paper has reviewed and discussed some of the emergent concepts and insights from key logistics documents, Force XXI, and AAN initiatives. Using the TRADOC DTLOMS, various concepts and initiatives were reviewed for their impact on how we can maintain and sustain our Army in the 21st century.

The DTLOMS model has revealed that our future logistics doctrine must be adaptable, dynamic, and capable of change on a much faster scale. We must also understand the relationship between logistics doctrine, and technology, so that our future doctrine can exploit technological change that is not necessarily materiel driven.

The training implications indicate that we will have to take bold steps towards integration with the public and private sectors. Our future training programs must offer America's young men and women the opportunity to become highly skilled individuals that can easily transition from military service to the private sector.

Logistic leaders at all levels will be the critical management nodes that make the seamless logistics systems work.

Our logistics leaders of the future must have the same skills and

abilities that industry will require for operating in knowledge based systems. If we grow and develop them with those skills, they not only become assets to the Army but to the nation as well.

Organizational change will be painful and emotional as senior leaders today and in the near future make the tough decision to let go of cultural bias and traditional force structure.

Logistical organizations are already being seen as a bill-payer for the future force structure, therefore it is imperative we get the resources necessary to enable them to become a leaner logistic force structure, but still capable of performing their mission. Failure to do so will result in an AAN force structure remaining tethered to an unwieldy umbilical cord not capable of fighting and winning the type of battles envisioned for the AAN.

The near-term fight seems to be over the individual materiel enablers, perhaps because the initial investments do not provide immediate reductions in personnel or force structure. The logistics community must band together and pool resources at the inter-service and national level to acquire the necessary materiel enablers. Failure to do so will result in antiquated logistics support, which is unable to support the AAN.

Our soldiers will be the battlespace human interface that makes the logistics system of the future operate, but we must be willing to make the kind of training investment in them that will provide the skills to work in the global environment of the 21st

century. Failure to attract young men and women by offering them technical skills will leave us with a hollow logistics system and maybe even the demise of military logistics in the battlespace.

Civilians, both DoD and the private sector, must also be considered. Our senior leaders are already laying the foundation, which will link our force projection Army to the civilian work force through programs like logistics civilian augmentation program (LOGCAP) and Modernization through Spares.

CONCLUSION

The future logistics force must be a fully digitized and integrated logistics "system of systems" linked from the tactical level to the strategic level. A seamless web of real time data feeds from soldier and weapon system sensors that anticipate requirements and generates responses. This type of real time anticipatory logistics will provide the right support, at the right time, to the right place.

Together, the warfighting concepts are the Army's "blueprint" for determining DTLOMS requirements across the combined arms and services team. Requirements not related to this blueprint are not and will not be resourced.³⁶

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